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REVIEW OF THE IMPLEMENTATION OF THE CONVENTION AND OF DECISIONS OF THE FIRST SESSION OF THE CONFERENCE OF THE PARTIES

COMMITMENTS IN ARTICLE 4

Second compilation and synthesis of first national communications from Annex I Parties

Executive summary by the secretariat

CONTENTS

		Paragraphs	Page
I.	INTRODUCTION	1 - 5	3
II.	NATIONAL CIRCUMSTANCES	6 - 15	4
III.	INVENTORIES OF ANTHROPOGENIC EMISSIONS AND REMOVALS	16 - 23	7
IV.	POLICIES AND MEASURES TO LIMIT ANTHROPOGENIC EMISSIONS AND PROTECT AND ENHANCE SINKS AND RESERVOIRS OF GREENHOUSE GASES AND THEIR SPECIFIC EFFECTS	24 - 31	9

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		Paragraphs	Page
V.	PROJECTIONS AND OVERALL EFFECTS OF POLICIES AND MEASURES	32 - 43	11
VI.	FINANCE, TECHNOLOGY AND CAPACITY BUILDING	44 - 49	14
VII.	IMPLEMENTATION OF OTHER COMMITMENTS AND RELATED ISSUES	50 - 57	15

Annex

Table 1	Anthropogenic emissions of CO_2, excluding land-use change and forestry, relative inventory figures for 1991-1994 and projections data for 2000	17
Table 2	Anthropogenic emissions of all greenhouse gases, excluding land-use change and forestry, relative data for 1991-1994 and projections data for 2000	18

I. INTRODUCTION

1. The second compilation and synthesis of first national communications from Parties included in Annex I to the Convention (hereinafter referred to as "Annex I Parties") consists of three parts: the executive summary (this document), the main report (FCCC/CP/1996/12/Add.1) and the tables of inventories of anthropogenic emissions and removals and projections for 2000 (FCCC/CP/1996/12/Add.2).

2. The second compilation and synthesis report on first national communications covers 31 Annex I Parties which submitted their national communications by 1 May 1996, that is, all Annex I Parties, except Belgium,[1] the European Community[2] and Lithuania,[3] plus Liechtenstein and Monaco which, though not listed in Annex I, have also submitted their communications. Belarus, Turkey and Ukraine, although included in Annex I, have not yet ratified or acceded to the Convention. This report also draws upon in-depth reviews (IDR) of communications from 21 Annex I Parties undertaken by international teams of experts and coordinated by the secretariat.

3. This compilation and synthesis report provides an overview of the implementation of the Convention by those Annex I Parties providing information through national communications and IDRs, noting trends and patterns, areas of convergence or divergence, data gaps and other findings, including the overall effects of policies and measures. A number of suggestions for revisions to the guidelines for the preparation of national communications aimed at making them more consistent, transparent and comparable, based on submissions from Parties and the experience from the review process, are included in document FCCC/SBSTA/1996/9. An overview of the review process, as well as suggestions for the schedule of submission of national communications, are included in document FCCC/CP/1996/13.

4. In accordance with decision 2/CP.1[4] both this summary and the main report include, as appropriate, the names of Parties[5] in the text, bearing in mind the facilitative and non-confrontational nature of the review process.

5. The main report contains text with graphs and illustrative tables, while full data, such as inventory and projections tables, are included in document FCCC/CP/1996/12/Add.2. Unless stated otherwise, all references to tables in this summary are to that document.

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[1] Submission due date 15 October 1996.

[2] Submission due date 21 September 1994.

[3] Submission due date 22 December 1995.

[4] For decisions adopted by the Conference of the Parties at its first session, see document FCCC/CP/1995/7/Add.1.

[5] All references to "Parties" in this document are to "Annex I Parties", except in section VI.

II. NATIONAL CIRCUMSTANCES

6. All reporting Parties described the national circumstances on the basis of which their climate change activities are formulated and implemented. The table summarizing national emissions reduction targets is presented in the main report. The descriptions of these circumstances contain a wide range of information and vary widely in their scope, focus and level of detail. Circumstances are not static, since they include, in addition to physical characteristics, economic conditions, as well as policy preferences and determination to take action, which can change, *inter alia*, in response to the climate change problems.

7. Descriptions of national circumstances are helpful in understanding the varying degree to which the Convention commitments are met, the approaches followed by each Party, the extent to which policies and measures are or can be implemented, in which sectors of the economy they are most effectively introduced and why specific types of policy instruments have been used. The differing national circumstances influence each Party's choice of action and the associated costs and benefits. The wide range of national circumstances explains the differing emissions profiles; it also affects projection scenarios reported by Parties. The understanding of these specific circumstances has been considerably enriched through the process of in-depth reviews. Each in-depth review report attempts to reflect the challenges faced and constraints encountered by the Party being reviewed in the implementation of its climate change programmes.

8. Descriptions of national circumstances do not always refer to the full area of the Party's territory either because parts of territory have been excluded upon ratification or accession to the Convention, or have not been considered for other reasons.

9. Important factors for any country are its natural endowments and the physical characteristics of its territory. Typically, natural endowments determine a country's share in international energy markets, the energy mix used for electricity production, heating and transport, energy production profiles, etc. A country's energy demand is related to its economy, its land area, its latitude and climatic conditions. A key factor in the development of energy demand is the consumption pattern of the population, which is determined by its size and density, its growth rate and dispersion in the national territory, and its purchasing power.

10. The overall structure of a country's economy and its energy profile usually indicate which are the largest and fastest growing sources of greenhouse gases (GHG). The largest sources of carbon dioxide (CO_2) emissions in Parties as a whole are the energy production and transformation and transport sectors. The Parties, however, differ in terms of their domestic energy supply and demand, their access to energy markets and the extent to which they use, or have the potential for, renewable and non-fossil energy sources. The agricultural and waste sectors, their share in national income and technological development largely

determine methane (CH_4) and nitrous oxide (N_2O) emissions in reporting Parties. For several Parties the enhancement of sinks, in particular forests, is an important part of their efforts aimed at limiting total net emissions.

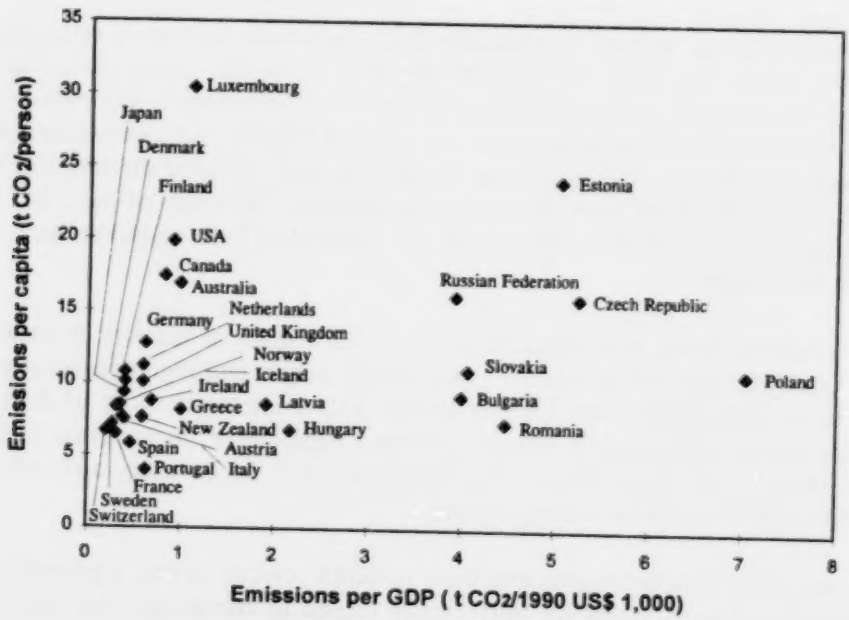
11. Equally important to the understanding of a country's climate change activities is a description of policy instruments available to the governments as a function of constitutional powers accorded to central and state governments. Political systems also influence a country's approach to mitigation and implementation of policies and measures. In some federal systems, the central government has only limited control over natural resource use, implementation of energy or transport policies, the levying of energy taxes, the administration of regulatory instruments, etc. In some Parties climate change policies have to be mutually agreed by central and provincial or state governments before funding is allocated. The in-depth review process is especially helpful for understanding the constraints and approaches used by those Parties in which provinces and states play an independent role in national policy-making. The institutional framework of each government and the level of independence of its agencies or ministries are also important factors related to climate change policies and measures. In many reporting Parties inter-ministerial committees have been established to support coordination and monitoring of such measures. In these Parties this is seen as an important step towards the integration of climate change considerations into economic and energy policies.

12. In the Parties with economies in transition (EIT) the switch to market economies initiated earlier this decade has been characterized by deep economic crisis, the collapse of traditional foreign markets and a sharp decrease in domestic consumption and industrial output, resulting in drastic drops in gross domestic product (GDP). As a consequence of this economic restructuring process, which in some Parties has also included the removal of energy subsidies, GHG emissions have decreased significantly. In many of the other Parties, economic recession in the first half of this decade has influenced both emissions and responses to climate change.

13. The EIT countries have been characterized by a high share of industry in national income, with a resulting high energy intensity per unit of output and high dependency on energy imports or on indigenous fossil fuel resources. Governments in many of these countries promote energy efficiency in order to decrease dependence on imported fuel and enhance energy security, but the profound structural changes in their energy and industrial sectors are yet to result in concrete energy savings.

14. Overall, national communications and their in-depth reviews reveal a growing consensus that climate change causes are intrinsically related to energy policies and that gains in energy efficiency make sense in economic terms while also improving a country's emissions profile. As economies overcome recession periods, climate change concerns, together with improvements in energy efficiency and more rational use of natural resources, are gradually being considered in conjunction with more strategic issues such as national energy security and diversification in supply sources.

15. The wide range of national circumstances can be illustrated by considering CO_2, a major GHG. Figure 1, in which per capita CO_2 emissions are plotted against CO_2 emissions per unit of GDP, gives such an illustration. Low CO_2 emissions per unit of GDP with high emissions per capita may indicate high energy efficiency levels and consumption patterns. High emissions per unit of GDP with high emissions per capita may reflect inefficient use of fossil fuels and/or a high share of fossil fuels, in particular coal, in the energy mix. Low emissions per unit of GDP with low emissions per capita could mean that the Party has a high share of hydro or nuclear power in its energy balance while having high living standards, or that the Party has a relatively small economy compared with other Annex I economies with the same population size. Relative "positions" of Parties are also the result of significant differences in current and historical prices of energy commodities. This figure suggests that, in spite of major differences in national circumstances, there are common characteristics for some groups of Parties, which could be taken into account in developing further commitments under the Convention.



Source: CO2 emissions data - UNFCCC secretariat, GDP data - UNCTAD.

Figure 1. CO_2 per capita emissions versus CO_2 emissions per unit of GDP, 1990.

III. INVENTORIES OF ANTHROPOGENIC EMISSIONS AND REMOVALS

16. All reporting Parties communicated national inventories of anthropogenic emissions by sources of GHG not controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer. With reference to Article 4.6, four EIT Parties have chosen a year other than 1990 as the base year for reporting, but they also provided a 1990 inventory (see tables 1 and 2 in annex hereto).

17. CO_2 was confirmed as being the most important anthropogenic GHG for the reporting Parties (80.5 per cent of total emissions in 1990, excluding land-use change and forestry), using the Intergovernmental Panel on Climate Change (IPCC) 1994 global warming potential (GWP) values. Fuel combustion was the largest source of CO_2 emissions (96.6 per cent), with most of these emissions coming from energy and transformation industries and transport. Managed forests were the largest carbon sink; no removals for gases other than CO_2 were reported. The largest source of CH_4 emissions was fugitive fuel emissions (37.8 per cent) followed by livestock (31.4 per cent) and waste (26.6 per cent) emissions. The largest source of N_2O emissions was agriculture (fertilizer use) 43.8 per cent, followed by industrial processes (29.9 per cent), although the reporting level for this category was low. Complete data for 1990 GHG emissions are contained in tables A.1 to A.8.[6]

18. Information provided by Parties about uncertainties in emission estimates demonstrated that estimates for most GHG emissions have a high degree of reliability, despite the lower confidence levels for CH_4 and N_2O emissions, thus providing a basis for implementing climate change policies and monitoring the effects of measures. Nevertheless, many Parties felt it desirable to further improve quantitative estimates reducing uncertainties wherever possible.

19. Some inconsistencies and difficulties in aggregating and comparing inventory data have arisen, owing to different definitions being used for source/sink categories and different assumptions made, and gases and/or categories being included by some Parties and not by others. The technical analysis of inventories, based on national communications, supporting material and in-depth reviews revealed information gaps. Adjustments in inventories used by some Parties were a factor complicating comparability, consistency and transparency of the emission estimates.

20. The analysis of inventory data demonstrated that more than 90 per cent of Parties reported GHG emissions for those activities where default IPCC methodologies were available, although the majority of Parties either used other methods or improved the default methodologies to suit their national conditions. This factor highlights the importance of improving default methodologies and developing new ones for additional sources or sinks.

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[6] See FCCC/CP/1996/12/Add.2.

21. Parties showed a willingness to provide additional supporting data and made substantial efforts to improve the quality of their inventories reporting. Problems of insufficient transparency as well as methodological problems mainly proved to be due to a lack of experience in preparing inventory data and imperfections in the guidelines. The majority of problems identified during the review of inventories can be solved by applying state-of-the-art methods in preparing and reporting GHG inventories. The land-use change and forestry source category is an exception which requires more scientific work to overcome existing difficulties, as well as improvements in the availability of activity data.

22. The review and synthesis of inventories was facilitated by the existence of the guidelines for the preparation of national communications, which Parties made considerable efforts to follow. Substantial progress was made, especially during the in-depth reviews, in understanding the problems of inventory reporting and in identifying areas for further work. With improvements in the guidelines, more comprehensive, comparable and consistent national inventory data could be obtained.

23. At the time of writing, 18 Annex I Parties have submitted to the secretariat inventory data for the years subsequent to 1990, as requested by decision 3/CP.1, although not all of them reported data for 1994. The available data are contained in tables C.1 to C.5.[7] Figure presents relative percentage changes in CO_2 emissions for these Parties in comparison to 1990 unadjusted inventory data (see also table 1 in the annex to this executive summary).

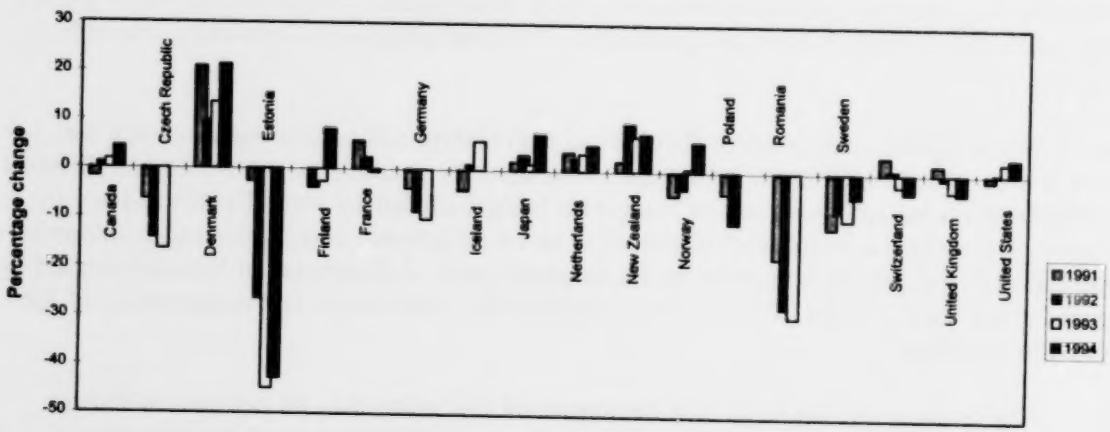

Figure 2. Percentage change in CO_2 emissions inventories (excluding sinks) in 1991-1994 with respect to 1990.

[7] See FCCC/CP/1996/12/Add.2.

IV. POLICIES AND MEASURES TO LIMIT ANTHROPOGENIC EMISSIONS AND PROTECT AND ENHANCE SINKS AND RESERVOIRS OF GREENHOUSE GASES AND THEIR SPECIFIC EFFECTS

24. All reporting Parties provided a description of the policies and measures they have adopted to implement their commitments under Article 4.2(a) and (b). The presentations varied significantly from Party to Party both in detail and approach, illustrating the diverse contexts in which they are implemented and the difficulties of presenting them in a way that is comparable to other countries. Policies and measures reported by Parties are described in detail in the main report,[8] and this summary only provides some general remarks and examples.

25. All Parties specifically targeted CO_2 emissions. GHGs other than CO_2 were also subject to a wide range of measures aimed at emissions reductions. A substantial number of measures are at the implementation stage with their effects expected in the medium to long term. For example, development and implementation of new and renewable energy sources (for example, biomass, geothermal, wind, solar energy) are often seen as important and promoted by various means, but only in a few countries do non-hydro renewable exceed 10 per cent of the present energy balance.

26. The choice of the type of policy instrument was generally related to national circumstances, such as political structure, overall economic situation, the organization of the energy sector or social considerations. They were implemented by both state and local governments, as well as the private sector. The IDRs confirmed a tendency to prefer policies that put limited burdens on public budgets, and in some cases even improved their balance. Economic instruments were often referred to as potentially the most effective type of measures. Voluntary agreements were used in several Parties, primarily in those sectors where other types of instruments were seen as less applicable for reasons of competitiveness, notably in industry, but also together with other instruments; a few Parties (e.g. Australia, Japan, United States) used voluntary agreements as a general approach to climate change problems. The IDRs demonstrated that, with some exceptions, voluntary agreements were in the early stages. In some Parties the use of energy efficient combined heat and power (CHP) stations was rapidly increasing as a result of specific policies or favourable market developments.

27. Mitigation of climate change was one of several reasons for implementing the majority of measures, the main rationale often being economic, in particular for measures improving energy efficiency in all sectors. A significant proportion of the measures were reported as the "no regrets" type. It was not always possible to distinguish from the communications between planned and implemented measures, and in the case of measures that were

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[8] See FCCC/CP/1996/12/Add.1.

implemented, indicators of progress were often missing. This last factor made it difficult to draw a parallel between effects expected from the most significant measures and the projected GHG levels for 2000; in-depth reviews have been helpful in clarifying these and other issues.

28. Removals of subsidies in, for example, the energy and agriculture sectors were reported to reduce CO_2, CH_4 and N_2O. Deregulation, especially in the electricity sector, was reported as a central factor causing reductions in several Parties. In the EIT Parties, the process of economic restructuring and establishing market prices on energy commodities caused the bulk of the reductions, and specific programmes directly aimed at mitigating climate change were often in an initial phase. For the Parties that reported policies and measures in the land-use change and forestry sector, these related mostly to forestry management, often aiming at sustainable utilization. IDRs confirmed that, at present, these practices in general result in increasing the sink capacity.

29. There was no uniform pattern of reporting on the effectiveness of measures across Parties which would enable specific conclusions to be drawn as regards their overall impact or applicability in the various sectors of the economy. The IDRs have addressed policies and measures initiated both before and after the base year, as these were seen by the teams as equally important for the trends in emissions. Information on effects of individual measures was often sketchy or based on assumptions that were not always transparent; the cost-effectiveness of measures, including specific information on costs and benefits, was rarely discussed thus making it difficult to evaluate what measures were the most significant or effective. Those measures which were identified as effective were not necessarily most frequently implemented, and sectors where descriptions of measures were most detailed or complete were not always the most important emitters or the fastest growing ones. For example, relatively few policies and measures were reported in the transport sector, despite the fact that emissions from this sector are rapidly growing in virtually all Parties. Although the IDRs revealed that considerable fuel and vehicle taxes, technical measures, support for public transport and physical planning measures are in place in several Parties and could slow emissions growth, this growth is still robust.

30. A number of Parties indicated the need to consider policies and measures requiring international cooperation, in particular taxes. Five Parties (Denmark, Finland, Netherlands, Norway, Sweden) had unilaterally implemented taxes aiming at reducing CO_2 emissions, taxing CO_2 only or both CO_2 and energy elements. These taxes had a number of exemptions for reasons of competitiveness (for energy-intensive industries, bunker fuels, fuels for electricity production), which were seen as necessary as long as such taxes were not applied in other countries. A frequently reported policy, although not yet implemented, was the combined CO_2/energy tax under discussion in the European Community. Some Parties to some extent also coordinated among themselves mitigation efforts, such as energy consumption standards for appliances that are sold on regional markets.

31. Some significant reductions were reported and partly implemented in the industrial sector, related to process changes in aluminium production resulting in reductions of PFC emissions, and in adipic acid production reducing emissions of nitrous oxide. In the waste sector, sorting, recycling and changed landfill management practices in several Parties are expected to yield considerable reductions in methane emissions towards the end of the decade and onwards. In the residential, commercial and institutional sector, the communications focused on regulations and standards for new buildings as well as on a variety of measures (taxes, demand-side management programmes, information and education) promoting efficient energy use in existing buildings. Some innovative measures were aimed at enhancing the development of energy efficient appliances.

V. PROJECTIONS AND OVERALL EFFECTS OF POLICIES AND MEASURES

32. The majority of the reporting Parties provided data for the three major greenhouse gases and presented projections for 2000; more than half of the Parties projected precursors and removals by sinks, and in several cases projections for other gases were also reported. Approximately half of the reporting Parties provided assessments or estimates of the total effects of measures, ranging from 4 to 20 per cent for CO_2 compared to baselines, and a wider range for other gases, often noting methodological difficulties. The projections are not comparable between Parties and the individual national totals have not been added. Full numerical data for projections are presented in tables B.1 to B.8;[9] tables 1 and 2, summarizing the inventory and projection data, are annexed to this document.

33. The projections were developed using different approaches and assumptions, although the latter were often based on, or in line with, those used by authoritative international sources. Most Parties provided enough information to allow for a qualitative understanding of the approaches used and further elaborated on them during the IDRs, although it was often not clear which policies and measures were reflected. Four Parties adjusted their base year figures upward to account for electricity imports or climatic anomalies in the base year (see tables 1 and 2 in the annex).

34. The following discussion compares projected figures for 2000 with the base year figures used in developing the projections. A comparison with inventory data was often not applicable since either Parties did not make projections for all gases reported in the inventories, or for all sources, or there were other differences. Some EIT Parties mentioned difficulties in making robust projections, due to the high level of uncertainty about economic growth, effects of the ongoing economic restructuring and insufficient statistical data.

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[9] See FCCC/CP/1996/12/Add.2.

35. All Parties but two (Monaco, Romania) provided "with measures" projections for CO_2, two Parties (Estonia, Germany) doing so after their communications were submitted. The projections reveal a different pattern for CO_2 (exclud ng land-use change and forestry sector) from that for other greenhouse gases. Seventeen Parties, accounting for about 61 per cent of 1990 CO_2 emissions, projected an increase to 2000 in the absence of additional measures. Fourteen Parties (Denmark, Germany, Luxembourg, Netherlands, Switzerland, United Kingdom and eight EITs) projected stabilization or decrease for 2000 in comparison to the base year levels. These represented 38 per cent of the 1990 inventories. In the EITs, the emissions decreased sharply in the first half of the 1990s. Several of them indicated that in the absence of additional measures their GHG emissions could start growing from 1994-1995, while still staying below the base year levels in 2000.

36. The IDRs demonstrated that for a number of Parties, higher growth in GDP, lower energy prices and a different implementation rate of policies and measures from that previously assumed are causing higher-than-anticipated growth in CO_2 emissions. For one Party (United Kingdom), reforms in the energy market resulted in fuel shifts and expected reductions in emissions. During the in-depth review, two other Parties (Ireland, Spain) reduced their estimates for the considerable emissions growth expected in this decade. Adjustments made by four Parties (Denmark, France, Netherlands, Switzerland) to their 1990 starting points for projections resulted in figures 3 to 12 per cent higher than the non-adjusted values, which changed the projections for three (Denmark, Netherlands, Switzerland) from growth or stabilization to reductions.

37. The IDRs also indicated that most Parties could face additional increases in CO_2 emissions after 2000 as a result of economic and/or population growth. In a number of Parties these increases were attributed to a freeze on new nuclear power capacity or decisions to phase it out, as well as to more self-reliance in electricity production. For all Parties but Latvia that provided sectoral projections, transport emissions were projected to grow, while both decreases and increases in emissions were projected for other sectors.

38. For seventeen Parties the land-use change and forestry sector was projected to remain a net removal, while Australia projected it to stay a net source, although a smaller one. Some Parties pointed out that in the longer term net removals will fluctuate around zero. For eleven Parties net CO_2 removals by the land-use change and forestry sector in 2000 were projected to increase, and three Parties (Denmark, Germany, United Kingdom) projected removals to remain stable. Latvia and Sweden indicated that their removals could be decreasing, while Finland presented a range with substantial increases and decreases both described as plausible options.

39. Projections for CH_4 emissions were provided by 26 Parties, although four of them did not include all sectors. All but three of these Parties (Australia, Canada, Luxembourg), accounting for 60 per cent of the aggregated inventory figures for 1990, projected stabilization or decreases in CH_4 emissions from their base years, thirteen of them projecting decreases of 10 to 70 per cent. The Parties that projected increases accounted for 9 per cent

of the aggregated inventory figures for 1990. Reductions in CH_4 emissions were often expected to be realized in the second half of the decade, reflecting, in particular, new waste treatment and disposal policies.

40. Fourteen Parties, accounting for 58 per cent of the aggregated inventory figure for N_2O for 1990, projected stabilization or decreases compared to their base years, four of them decreases of more than 35 per cent, often due to expected improvements in industrial processes. Ten Parties, accounting for 26 per cent of the aggregated inventory figures for 1990, projected increases, eight of these of less than 10 per cent. Fewer Parties provided projections for other gases and precursors but for those that did so, emissions of perfluorocarbons (PFCs) and precursors are often projected to decrease, while emissions of hydrofluorocarbons (HFCs) increase as they replace substances being phased out under the Montreal Protocol.

41. When all projected emissions (excluding land-use change and forestry) are totalled using IPCC-1994 GWP for all Parties, sixteen of them (Denmark, France, Germany, Iceland, Luxembourg, Netherlands, Switzerland, United Kingdom and eight EITs), accounting for 42 per cent of the aggregated 1990 inventory figure, projected stabilization or decrease. Fifteen Parties, accounting for 55 per cent of the aggregated 1990 inventory, projected an increase; three of these (Japan, New Zealand and United States), accounting for 42 cent of the aggregated 1990 inventory, projected an increase of 2 per cent or less. If unadjusted figures had been compared, one more Party (Denmark) would have shown an increase, while the other three (France, Netherlands, Switzerland) that applied adjustments would still show stabilization or decrease.

42. When the available data for land-use change and forestry reported by eighteen Parties are aggregated with other projected emissions, considerable differences between net and gross figures occur for several Parties. It should be noted that the secretariat received comments from some Parties questioning the appropriateness of presenting such net data; these comments are discussed in document FCCC/SBSTA/9/Add.1. Eighteen Parties, accounting for 76 per cent of the aggregated inventory figure for 1990, projected stabilization or decrease for this sector. Eight of these were Parties with economies in transition. Thirteen Parties, accounting for 23 per cent of 1990 emissions, projected increases. If unadjusted figures had been compared, another Party (Denmark) would have shown an increase, while the other three (France, Netherlands, Switzerland) that applied adjustments would still have shown stabilization or decrease.

43. In due course, it will be possible to assess progress towards achievement of the aim of returning emissions to 1990 levels by 2000 by comparing the inventory figures for these two years. At present, a comparison of projections for 2000 with inventories for the base year and the information obtained from the IDRs, suggests that for the majority of Annex I Parties additional measures would be needed to return CO_2 emissions to their 1990 level by 2000. A similar comparison made using GWPs for all GHGs combined (excluding land-use change and forestry sector), indicates that several Annex I Parties could have difficulties in returning

these emissions to their 1990 levels in 2000. Inventory data for 1991-1994 submitted to the secretariat so far by several of the Annex I Parties seem to justify this concern (see tables 1 and 2 annexed to this document). Although an initial rise is not inconsistent with the aim of returning emissions to 1990 levels by 2000, it suggests that additional efforts may be needed in the remaining few years. Nevertheless, during the IDRs some indications were given that in a number of Parties which projected growth in emissions, return to their base year levels was felt to be within reach.

VI. FINANCE, TECHNOLOGY AND CAPACITY BUILDING

44. In accordance with Article 12.3 of the Convention, 20 out of 22 reporting Annex II Parties described measures taken to meet their commitments outlined in Article 4.3, 4.4 and 4.5. The majority of Parties[10] reported on their contributions to the Global Environment Facility (GEF), some Parties stating explicitly that such contributions were new and additional. In addition to funding of the GEF some Parties reported on other means of financing through their official development assistance (ODA).[11]

45. Most of the Parties reported on activities implemented through bilateral, regional and multilateral channels. Due to the varying degree and breadth of reporting it was not possible to quantify aid flows supportive of the Convention at an aggregate level and it was therefore difficult to draw a comparative summary of the comprehensiveness of activities.

46. The majority of Parties discussed support for the transfer of technology through multilateral and bilateral cooperation, and in a few cases through private sector cooperation. The information differed considerably in format, thoroughness and level of detail and consequently a comprehensive portrayal of technology transfer activities is not possible at this stage. The bilateral cooperation activities reported were often related to "hard" technologies rather than to the "soft" technologies of capacity building, training and research.

47. The majority of Parties in their discussions on bilateral channels of assistance either explicitly or implicitly touched on assistance in capacity building. The areas of assistance most often referred to were: general or managerial training in relation to energy (efficiency and renewable energy), forestry, natural resources, impacts and vulnerability, technology and meteorology; country studies activities, including development of inventories and databases, identification of mitigation and adaptation response options and development of strategies; research activities to strengthen the capacity of developing countries, including exchanges and funding of joint projects.

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[10] All references to Parties in this section are to Parties included in Annex II.

[11] It should be noted that, starting in 1996, up to a maximum of 84 per cent of contributions to the GEF can now be reported as ODA.

48. About half of the Parties reported on cooperation with developing countries in activities related to adaptation and vulnerability assessment. The types of projects and activities that were most often discussed dealt with studies of vulnerability assessment and potential impacts, including natural hazards prevention and disaster control, adapting agriculture to the impact of climate change, ecosystem management, coastal zone management, studies of sealevel rise and capacity building of meteorological services.

49. Half of the Parties reported on activities to assist countries with economies in transition. The majority of these cooperative activities were capacity building initiatives and technology transfer, thus relevant to the implementation of Article 4.5. The activities included: the enhancement of capacities through country studies, inventories assistance, and policy planning and formation; institution building initiatives such as assistance for increasing plant safety (nuclear), improvement of technical systems and stiffening of regulatory regimes; the transfer of technology through technological and commercial partnerships, including partnerships and cooperative arrangements for pipeline production and gas transportation; efforts to increase energy efficiency in the transportation and residential sectors, the conversion of power plants to more efficient technologies, and the promotion of renewable energy sources.

VII. IMPLEMENTATION OF OTHER COMMITMENTS AND RELATED ISSUES

50. With regard to commitments under Article 4.1(b) and (e), 23 national communications discussed in varying detail, the vulnerability of ecosystems, economic sectors and society and the expected impacts of climate change thereon.[12] The communications generally treated the expected impacts of climate change and vulnerability to climate change as a single issue, but the former was more often discussed.

51. Some Parties included information on a national climate change scenario (derived from existing models) which was used as a basis for assessing potential impacts and vulnerability. The uncertainties regarding the scenarios were noted, particularly the inadequacy of global models for predicting regional or national climate change. Different time-scales and key assumptions were used to predict possible temperature increases or other climate change impacts.

52. Uncertainties with regard to the prediction of climate change were mentioned by some Parties as a fundamental problem in assessing possible impacts of climate change and the consequent vulnerability of ecosystems, sectors of the economy and society. In addition, many communications mentioned that impacts and vulnerability were difficult to assess

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[12] "Vulnerability" and "impact" are defined as in the *IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation*, WMO/UNEP, Geneva, 1994, p.3.

because of the complexity of the systems and the interactions among several factors. They emphasized that improving the prediction of national or regional climate change was the essential first step.

53. Many Parties included some discussion of adaptation measures. Less than half of them reported on adaptation activities other than research. Most of the reported measures are also targeted to other current needs. Some Parties mentioned supporting measures to achieve a better adaptation to climate change impacts such as administrative changes, management plans and strategies. The relatively low degree of reporting about vulnerability and adaptation suggests that a high level of uncertainty in this regard, rather than a non-fulfilment of the current guidelines.

54. The majority of Parties reported on research and systematic observation, although the scope of coverage, depth and level of detail varied widely. Research activities covered a wide spectrum including scientific research, climate change impacts and response adaptation measures. Considerable attention was devoted to research into greenhouse gas emissions, particularly in the energy field but also in other areas, including agriculture and forestry.

55. Scientific research included not only atmospheric chemistry but also studies on regional climate change and sealevel rise. Although most Parties indicated that current research is taking place nationally, a number also stated that they participated in international research activities particularly those organized under the World Climate Research Programme, the International Geosphere-Biosphere Programme and the Man and Biosphere Programme. Many also mentioned their active participation in the work of the IPCC.

56. The issues of public awareness, information dissemination, education, training and participation were, in general, well described by the majority of Parties. Many communications provided an extensive account of the initiatives taken in this area while others described only a few specific projects to illustrate the general approach.

57. The programmes relating to public awareness focused on campaigns to provide information on the effects of climate change and to promote the social acceptability of policies through voluntary action to reduce emissions. The information campaigns described were aimed at the general public, although a number did focus on specific groups. The themes of the campaigns centred mostly on the promotion of energy-efficient behaviour for the reduction of CO_2 emissions, including practical guidance in some cases. Other areas of focus included the effects of climate change, the promotion of renewable energy and the protection of forests. Public participation in the form of collaborative action and partnerships between the Government and other groups was described in the majority of the communications, although the extent of public involvement varied considerably. Only a few Parties commented on the form and effectiveness of their programmes relating to education, training and public awareness.

Annex

Table 1. Anthropogenic emissions of CO_2, excluding land-use change and forestry, relative inventory figures for 1991-1994 and projections data for 2000

	Data from inventories					Data from projections[a]
	(percentage relative to 1990, 1990=100)					
	1990 (Gg)	1991 %	1992 %	1993 %	1994 %	2000 %
Australia	288 965					115
Austria	59 200					110
Bulgaria (1990)	82 990					84
Bulgaria (1988)[b]	96 878					72
Canada	462 643	98	101	102	105	113
Czech Republic	165 792	94	86	84		83
Denmark	52 025	121	110	114	121	103
Denmark (electr. trade adjusted)[c]	58 278	105	104	103	101	92
Estonia	37 797	97	74	55	57	46 - 61
Finland	53 900	100	96	97	108	130
France (temp. adjusted)[d]	366 536	106	102	100		104[d]
Germany	1 014 155	96	91	90		90
Greece	82 100					115
Hungary (1990)	71 673					99
Hungary (1985-1987)[b]	83 676					84
Iceland	2 172	96	101	106		105
Ireland	30 719					<120
Italy	428 941					114
Japan	1 155 000	102	103	101	107	102
Latvia	22 976					<74
Liechtenstein	208					118
Luxembourg	11 343					67
Monaco	71					
Netherlands	167 600	104	103	104	105	>100
Netherlands (temp. adjusted)[e]	174 000	100	101	100	102	>96
New Zealand	25 476	102	110	107	108	>(114 -117)
Norway	35 514	95	96	101	106	114
Poland (1990)	414 930	96	90			
Poland (1988)[b]	478 880	83	78			74 - 99
Portugal	42 148					140
Romania (1990)	171 103	83	72	70		
Romania (1989)[b]	198 479	71	62	61		
Russian Federation	2 388 720					83 - 87
Slovakia	58 278					84
Spain	227 322					116
Sweden	61 256	89	92	90	95	104
Switzerland (temp. adjusted)[d]	45 070	103	101	98	96	96[d]
United Kingdom	577 012	102	99	97	96	92 - 96
United States	4 957 022	99	100	103	103	>103

a) For further notes to the 2000 figures see table B.1 (FCCC/CP/1996/12/Add.2).
b) Some Parties with economies in transition have chosen different base years than 1990, referring to Article 4.6.
c) All figures are adjusted for electricity trade.
d) The 2000 figure refers to the temperature adjusted 1990 figure.
e) All figures are adjusted for temperature.

Table 2. Anthropogenic emissions of all greenhouse gases, excluding land-use change and forestry, relative data for 1991-1994 and projections data for 2000 (CO_2 equivalent in gigagrams using IPCC 1994 GWPs, time horizon = 100 years)

	Data from inventories					Data from projections[a]
	(percentage relative to 1990, 1990=100)					
	1990 (Gg)	1991 %	1992 %	1993 %	1994 %	2000 %
Australia	465 305					110
Austria	75 286					108
Bulgaria (1990)	123 755					90
Bulgaria (1988)[b]	141 345					78
Canada	577 954	99	102	103	106	112 - 114
Czech Republic	196 551					83
Denmark	65 517	117	108	111	119	101
Denmark (electr. trade adjusted)[c]	71 770	104	103	103	103	92
Estonia	46 479	96	73	55	57	46 - 61
Finland	67 114	100	91	92	102	124
France (temp. adjusted)[d]	494 032	104	101	99		98[d]
Germany	1 241 509	94	90	90		87
Greece	94 888					113
Hungary (1990)	88 674					93
Hungary (1985-1987)[b]	104 082					78
Iceland	3 227	95	92	94		96
Ireland	63 757					111
Italy	563 117					107
Japan	1 206 523	102	103	101		102
Latvia	27 640					73
Liechtenstein	265					118
Luxembourg	12 123					70
Monaco	71					
Netherlands	213 946	105	103	104	105	97
Netherlands (temp. adjusted)[e]	220 346	102	102	101	103	94
New Zealand	80 266	99	101	99	100	101 - 102
Norway	52 235	96	92	96	100	104
Poland (1990)	614 300		73			
Poland (1988)[b]	572 257		78			64 - 82
Portugal	51 045					140
Romania (1990)	253 152	84	72	75		
Romania (1989)[b]	276 859	51	45	44		
Russian Federation	3 078 892					83 - 87
Slovakia	71 900					85
Spain	310 070					76
Sweden	75 573		91		95	105
Switzerland (temp. adjusted)[d]	58 196	103	100	98	97	97[d]
United Kingdom	724 754	101	97	94	94	94
United States	5 842 371	99	101	102	103	101

a) The 2000 figure may not cover all gases and sources covered by the inventory data, see table B.6 (FCCC/CP/1996/12/Add.2).
b) Some Parties with economies in transition have chosen different base years than 1990, referring to Article 4.6.
c) All figures are adjusted for electricity trade.
d) The 2000 figure refers to the temperature adjusted 1990 figure.
e) All figures are adjusted for temperature.